

# **California Interagency Working Group on Indoor Air Quality**

## **Meeting Minutes**

**(Combined)**

**March 8, 2000**

**Air Resources Board Headquarters  
2020 L Street, Sacramento**

**June 14, 1999**

**Department of Health Services Laboratory Facility  
2151 Berkeley Way, Berkeley**

### **GENERAL ANNOUNCEMENTS**

### **SPECIAL PRESENTATION**

### **AGENCY REPORTS ON CURRENT IAQ ACTIVITIES**

American Lung Association – Los Angeles County  
California Air Resources Board / IAQ & Personal Exposure Assessment Program  
California Department of Health Service / Environmental Health Investigations Branch  
California Department of Health Service / Indoor Air Quality Section  
California Department of Health Service / Occupational Health Branch  
California Department of Health Service / Tobacco Control Section  
California Department of Industrial Relations (Cal/OSHA)  
Lawrence Berkeley National Laboratory / Indoor Environments Program  
Office of Environmental Health Hazard Assessment / Indoor Air Risk Assessment Group  
U.S. EPA Region IX / Indoor Environment Team

### **WORKING GROUP COMMITTEES**

**Indoor Environmental Quality of Schools**  
Building Design and Operations

### **FUTURE MEETINGS**

## GENERAL ANNOUNCEMENTS

- The **IAQ Tools for Schools National Symposium** will take place in Baltimore, MD, August 3-5, 2000.
- University of Tulsa IAQ Program Training Center will be giving its Courses, **IAQ: Biological Remediation and Control** and **Sampling for Biological Contamination in Buildings**, on September 12-13, 2000 in San Diego. (<http://www.utulsa.edu/iaqprogram/>).
- MidAtlantic Environmental Hygiene Resource Center (<http://www.mehrc.org/>) will be giving its indoor environmental quality training course, **Assessment, Remediation and Prevention of Mold Growth in Buildings**, September 21-23, 2000, Baltimore, MD.
- The **International Society of Exposure Analysis Conference** (ISEA) is holding its annual conference October 24-27, 2000 at the Asilomar Conference Center. Conference co-chairs are Tom McKone and Jed Waldman. Conference information can be found on-line at the web site: <http://www.iseaweb.org/isea2000/isea2000.html>.
- **Group Roster.** Members can distribute notices on upcoming events to the CIWG-IAQ members. However, in the interest of keeping the roster off of distribution lists, please direct notices to my attention ([JWaldman@dhs.ca.gov](mailto:JWaldman@dhs.ca.gov)), and I will send them out.

## SPECIAL PRESENTATION

At the June 14<sup>th</sup> meeting, **Jan Stensland-Patton** (Jan@JSPattoncom) of the Green Resources Center in Berkeley gave a presentation on **Green Building Resources in California**, information on resources and activities that are also be relevant in addressing IAQ and healthy buildings. Attached to the minutes is the outline for Ms. Patton's presentation on [PVC in Buildings](#).

Useful links on green building resources and related topics can be found on-line at: <http://www.adpsr-norcal.org/> and <http://www.GreenResourceCenter.org>.

## AGENCY REPORTS ON CURRENT IAQ ACTIVITIES

### American Lung Association – Los Angeles County

-- Arlene Feingold, [Feingolda@lalung.org](mailto:Feingolda@lalung.org) <http://www.lalung.org/>

ALA-LAC is promoting the U.S. EPA's *IAQ Tools for Schools Program* in the Los Angeles Unified School District (LAUSD). On April 3<sup>rd</sup>, we had a Mentor Training Workshop for 12 new mentors, 4 previously trained mentors, and one person from ALA of San Diego (Susanna Concha-Garcia ) who is hoping to start TFS in San Diego. The training was conducted by Shelly Rosenblum; Gary Pons, LAUSD Industrial Hygienist, was a guest speaker; and the previous trained mentors relayed their experiences with TFS. We are contact with all the mentors and making a concerted effort to pair every mentor with a school. We are targeting schools that are underserved and/or have specific air quality problems for TFS. To increase our chances of success, we will try to implement TFS in the vicinities where we already have established contacts through various other ALA programs, such as *Open Airways* for asthmatic children or *Huff and Puff*, a tobacco related program.

### California Air Resources Board / Indoor Air Quality & Personal Exposure Assessment Program

<http://www.arb.ca.gov/research/indoor/indoor.htm>

B Peggy Jenkins ([mjenkins@arb.ca.gov](mailto:mjenkins@arb.ca.gov))

**IAQ Symposium.** ARB sponsored a symposium on May 3-4 in Sacramento to promote actions to reduce the risk posed by indoor pollution. The Department of Health Services (DHS) served as co-sponsor. About 170 people from all levels of government, school districts, private consulting firms, environmental groups, the media, and others attended the symposium. Topics on the first day included scientific updates on Californians' exposures to indoor air pollution and associated risks, the costs of indoor pollution, and approaches to reducing indoor pollutants. On day two, State agency leaders discussed needed policy changes and actions that might be taken to address them. Participants clearly stated that a comprehensive and coordinated approach is needed to reduce risks from this public health hazard. A summary report from the symposium is expected to be available this coming fall.

**Portable Classroom Study.** The Legislature approved an allocation of \$1 million in the 2000-2001 budget year for a study of environmental conditions in portable classrooms, which will be conducted jointly by DHS and ARB. On July 21, the ARB's Research Screening Committee approved a Request for Proposals for the field portion of the study. The study will examine VOC concentrations and sources in the classrooms, including formaldehyde; heating, cooling, and ventilation system performance and maintenance; the presence of mold and other biological contaminants; and other factors. The Request for Proposals (RFP) will be released on August 3<sup>rd</sup>, and proposals will be due in mid-September. Fieldwork is expected to begin spring 2001.

**Childhood Asthma Study.** The ARB has funded a new five-year study to examine the relationship between air pollutants and childhood asthma. The UC Berkeley investigators, Drs. Ira Tager and Katherine Hammond, will measure pollutants and allergens outdoors and indoors along with data on the children's health and asthma attacks. Approximately 500 children will be

involved in the study. It is anticipated that indoor exposure monitoring will be conducted for about 100 of the children. The study is called FACES (Fresno Asthma Children's Exposure Study). Indoor Program staff will serve as advisors to the study and manage some of the exposure assessment portions of the project.

**Residential Cooking Study.** A study to measure pollutant exposures and emission factors during various residential cooking activities is nearing completion. Staff visited the test home in Rohnert Park in the spring and observed data collection during stovetop and oven cooking, oven cleaning, and microwaving. The draft final report is due this fall, and papers will be presented at a conference of the International Society of Exposure Analysis in Asilomar in October.

**Residential Air Cleaning Devices Fact Sheet.** ARB recently published a fact sheet on Residential Air Cleaning Devices, authored primarily by Tom Phillips. The fact sheet answers common questions about air cleaners, dispels common myths, and recommends against using ozone generators. It is posted on-line at: <http://www.arb.ca.gov/research/indoor/acdsum.htm>.

## **Presentations**

- Scott Fruin and Steve Hui presented some of the findings from ARB's studies relevant to estimating gasoline-related exposures at OEHHHA's recent workshop on assessing the health impacts of gasoline-related exposures, held on June 26 and 27 in Oakland. Useful information included results from ARB's activity pattern studies, a recently completed study of pollutant concentrations inside vehicles as they were driven on California roadways, and others.
- Indoor Program staff participated in a forest fire/smoke workshop sponsored by OEHHHA, May 21<sup>st</sup>. Staff presented summaries of the literature on indoor sources of exposures to combustion pollutants and on penetration of outdoor particulate matter into buildings. They estimated that staying inside a building and avoiding the use of indoor combustion sources can provide some protection from outdoor particles emitted during fires—up to 60% protection combined. Staff participated in discussions of research and hazard reduction needs.
- In April, ARB's Indoor Program staff presented information to the Board at a meeting in San Diego on the indoor exposure and risks in California, and emphasized the need for further action to address this important issue. The Board expressed deep concern and asked the staff to return in the fall with a report on the May symposium and suggestions for further actions that the Board might take. Staff is scheduled to return to the Board at their November meeting in Sacramento.
- Staff met with a science class at River City High School in West Sacramento to answer questions about indoor air quality in their school. The class is conducting a project to understand the role of indoor pollutant sources, other pollutant pathways, ventilation systems, and occupant activities and susceptibilities. About four of the 25 students are asthmatic, a few others are allergic, and a few admit to smoking. We were informed that the campus apparently has a history of problems, such as flooded rooms, classrooms without any ventilation or filter replacement, construction repairs during building occupancy, and parking lots next to buildings.

**Green Building Task Force Activities.** Staff remain active on the State's Green Building Task Force, and recently attended a seminar on green office buildings sponsored by the Task Force.

Presenters summarized several case studies and focused on certain project specifics that are critical to success, such as upfront financial and personal commitment to green building, and reviewed the latest methods in life cycle analysis for evaluating and rating green buildings. Staff also have had input on the furniture emissions test protocols.

**New Research Division Chief.** The new Chief of ARB's Research Division is Bart Croes, P.E., who previously served as a branch chief in ARB's Planning and Technical Support Division.

## California Department of Health Service / Environmental Health Investigations Branch

<http://www.dhs.ca.gov/ps/deodc/ehib/>

B Sandra McNeel ([SMcNeel@dhs.ca.gov](mailto:SMcNeel@dhs.ca.gov))

**California County Asthma Mortality and Hospitalization Rates.** EHIB staff has produced two reports on county rates of asthma from 1990 through 1997. The first report on asthma mortality rates by county has been approved and is available for public release. This report will also be added soon to the EHIB web site. The companion report on asthma hospitalization rates by county is still undergoing agency level review and is expected to be available for public release soon. (Contact: Julie Von Behren, [jvonbehr@dhs.ca.gov](mailto:jvonbehr@dhs.ca.gov)).

**Schools.** Staff responded to a request for assistance from the Alameda County Health Officer regarding indoor mold at several schools in the Fremont Unified School District. We provided information regarding the health effects associated with *Stachybotrys chartarum* and other fungi found in classrooms for inclusion in printed material distributed to school administrators and parents. Staff also provided technical assistance to the Health Officer during a public meeting with parents, fielding questions regarding many aspects of indoor air quality and potential health effects for sensitive groups such as preschoolers and children with developmental disabilities. (Contact: Sandy McNeel, [smcneel@dhs.ca.gov](mailto:smcneel@dhs.ca.gov) or Debra Gilliss, [dgilliss@dhs.ca.gov](mailto:dgilliss@dhs.ca.gov)).

**Mold.** Staff was also asked by the administration of San Francisco State University to review an environmental consultant's report regarding potential health risks from fungi within the walls of a 10-year-old residence apartment building. We reviewed the consultants' report, toured the affected building, provided technical assistance at a public meeting for residents, made recommendations to the administration regarding more thorough evaluation of the building and providing alternate housing to residents and discussed mold remediation strategies with the university custodial service. (Contact: Sandy McNeel, [smcneel@dhs.ca.gov](mailto:smcneel@dhs.ca.gov) or Debra Gilliss, [dgilliss@dhs.ca.gov](mailto:dgilliss@dhs.ca.gov)).

### Presentations and Committees

- Sandy McNeel spoke to environmental health, building management and other officials from Solano and Napa counties on health effects of indoor fungi, remediation strategies and prevention, March 30, 2000.
- Sandy McNeel presented information on indoor mold remediation and prevention at the ARB/DHS sponsored seminar, "Indoor Air Quality: Risk Reduction in the 21<sup>st</sup> Century", May 3, 2000.
- Debra Gilliss spoke at the California Public Health Association combined North and South symposium on indoor air quality and schools, May 12, 2000.

## California Department of Health Service / Indoor Air Quality Section

B Jed Waldman ([JWaldman@dhs.ca.gov](mailto:JWaldman@dhs.ca.gov))

<http://www.cal-iaq.org>

**BASE Study.** The IAQ staff is starting the review of data sets from the U.S. EPA Building Assessment & Survey Evaluation (BASE) study of 100 buildings. Key efforts will be looking at the vast and complex data on bioaerosol measurements. A large initial effort is being applied on “data clean-up.” Contact: Kai-Shen Liu, [KLiu@dhs.ca.gov](mailto:KLiu@dhs.ca.gov).

**Children’s Exposure Studies.** Janet Macher continues collaborations with researcher on two important studies on children’s exposure: the NIEHS-funded *Community Partnership for Evaluating and Preventing Pesticide Exposures to Young Children* (Salinas); and the CARB-funded *Responses to Short-term Fluctuations in Particulate Air Pollution in Asthmatic Children: Implications for Asthma Natural History, Part B: Characterization of Asthmatic Children’s Air Pollution Exposure* (Fresno). A UC Berkeley student, Lisa Pheatt, will be conducting her senior project, *Endotoxin in Air and Dust, Particle Size Distribution of Airborne Endotoxin*, in conjunction with the Salinas study, under Janet. Contact: Janet Macher, [Jmacher@dhs.ca.gov](mailto:Jmacher@dhs.ca.gov).

**Environmental Tobacco Smoke (ETS) Study.** Staff has begun work on the TRDRP-funded study, *The effectiveness of designated smoking rooms in relation to AB 13*. A comparison study of two real time particle-phase instruments was completed at LBNL. The data produced supported the use of a real-time aethalometer for determination of ETS-derived particulate matter. The experimental chamber at LBNL is nearly ready for experiments. We will start the chamber studies later in the summer. DHS staff will be conducting laboratory analyses of nicotine samples, and a senior chemist is preparing for this task. We are still awaiting receipt of the most recent California Tobacco Survey (CTS) data from the DHS Tobacco Control Section. This survey includes responses on several modified questions relating to workplace smoking policy submitted by IAQ staff. Contact: Leon Alevantis, [Lalevant@dhs.ca.gov](mailto:Lalevant@dhs.ca.gov).

**Lead in Homes.** IAQ staff has conducted statistical analyses for results of the chamber experiments done by Steve Wall of the Outdoor Air Quality Section. This component of a HUD-funded study of lead in homes is aimed to evaluate the efficiency of various vacuum cleaners in cleaning lead dust from solid surface flooring. They also work with the Childhood Lead Prevention Branch on data input, format and management of results to be collected from field work. In the microscopy lab, Don Scales ([Dscales1@dhs.ca.gov](mailto:Dscales1@dhs.ca.gov)) is studying household dust samples using our new Scanning Electron Microscope (SEM). Particles are surveyed for the presence of lead using x-ray microanalysis. Don reports that the back-scattered images turn out to easily discriminate between heavy metal particles and others. He is presently investigating the size and composition of these heavy-metal particles. Contact: Kai-Shen Liu, [Kliu@dhs.ca.gov](mailto:Kliu@dhs.ca.gov).

**Indoor Air Quality Workshop for State & Local Officials.** On March 24 and 25, 2000, Jed Waldman attended a workshop in Washington, D.C., for state and local indoor air quality (IAQ) officials from around the United States. This was the second such workshop convened by the Environmental Law Institute (ELI); the first took place 18 months earlier, in October 1998. Both workshops were sponsored by the U.S. EPA’s Indoor Environments Division. Officials from 24 states and 6 local (county/city) governments participated in the workshop, along with



representatives from the U.S. Department of Housing and Urban Development (HUD), the Centers for Disease Control and Prevention (CDC), and three offices within the U.S. EPA. In addition, the U.S. Green Building Council participated in a workshop session on incorporating indoor air quality issues into green building activities. The central purpose of the meeting was to provide an opportunity for officials from around the country to share ideas, questions and strategies on building sustainable indoor air quality programs. A summary report has been prepared by ELI staff, and it can be requested from ELI (<http://www.eli.org>).

**Portable Classroom Study.** DHS staff has been working with ARB staff on the study design and ARB's Request for Proposal for contractors to conduct the major field activities in the study. The study will examine VOC concentrations and sources in the classrooms, including formaldehyde; heating, cooling, and ventilation system performance and maintenance; the presence of mold and other biological contaminants; and other factors. IAQ laboratory staff will conduct determinations of allergens (dust mite, cat, dog, etc.) in dust sample extracted collected in classrooms. See the description given in the ARB Section.

**Sierra Radon Survey.** In the spring, staff visited 52 households in selected Sierra counties to verify questionnaire answers and radon monitors placement for QA/QC purposes. Water samples were also taken to determine the radon level in drinking water. Radon monitors placed in the household will be retrieved January 2001. Radon monitors placed in 25 public elementary schools were retrieved at the end of the school semester and sent for lab analysis. Contact: Feng Tsai, [FTsai@dhs.ca.gov](mailto:FTsai@dhs.ca.gov).

**Visiting Scientist.** Jeff Wagner, a recent graduate from the University of North Carolina at Chapel Hill, is collaborating with Janet Macher as a visiting post-doctoral scientist. Jeff is continuing work on a personal particle sampler that is miniature, passive, and capable of providing mass and chemical speciation as a function of particle size. An automated analysis technique is currently being devised for the sampler. The technique utilizes an environmental Scanning Electron Microscope (SEM) and X-ray analyzer that have been programmed to acquire images and count and size particles automatically. This method should allow the sampling of lower aerosol concentrations over shorter time periods. The improved capabilities of the passive sampler will be tested in three different indoor environments using both 24-hour and 2-week samples. Passive results will be compared to those of several conventional, size-selective samplers, including a 37mm cyclone, *MS&T* impactor, and a *Marple* Personal Cascade Impactor. His work is sponsored by UNC in conjunction with the National Institute of Occupational Safety and Health.

**VOC Study.** After numerous delays due to lab remodeling, staff reassignment, and instrument failures, we are continuing the VOC study of new building materials. We have completed assembly of the mini-chambers where the building materials will be tested. We are now in the process of establishing a zero-VOC background before testing samples of actual building materials.

#### **Presentations**

- Leon Alevantis gave a presentation on *Indoor Air Quality-related Legislation in California* at the European Commission's Workshop on Urban Air, Indoor Environment and Human

Exposure in Thessaloniki, Greece in April 16-18.

- Leon Alevantis moderated a seminar on Green Building Practices on March 7, in Sacramento. Anthony Bernheim and Hal Levin, two leading professional in the green architectural field, gave presentations.
- Kai-Shen Liu, a member of the Environmental Models Subcommittee of the U.S. EPA Science Advisory Board (SAB) Executive Committee, attended a SAB meeting in December 1999 to review the *Total Risk Integrated Methodology*. Also a member of the Integrated Human Exposure Committee of the U.S. EPA SAB, Kai-Shen Liu attended a SAB meeting in July to review the *Strategic Plan for the Analysis of the NHEXAS Pilot Studies Data*.
- Janet Macher gave several presentations on *Biological Assessment and Control (BASE Study Data Analysis Plans)*: Yuma Pacific-Southwest Section AIHA meeting (Jan 20); Northern California Association of Public Health Microbiologists Annual Spring Meeting (Apr 29) and *Biological Assessment and Control (BASE Study Data Analysis Plans)*: Case Studies in Industrial Hygiene (PH 268B) (Mar 1, 8).
- Jed Waldman presented on a talk on "A Short History of the Role of IAQ in the Promotion of Greening Public Buildings in California," at ELI's *IAQ Workshop for State & Local Officials* (see above) in March.
- Jed Waldman gave a presentation on "Indoor Environmental Quality Issues in California Public Schools" at the ARB/DHS IAQ Symposium in May.

## California Department of Health Service / Occupational Health Branch

B Jim Cone ([Jcone@ohb.org](mailto:Jcone@ohb.org)) and Liz Katz ([Ekatz@dhs.ca.gov](mailto:Ekatz@dhs.ca.gov))

<http://www.ohb.gov>

**Pollution Prevention Inter-Agency Working Group Meeting.** HESIS participated in a meeting of DHS, DIR and Cal-EPA representatives convened by Maggie Robbins (California Labor Federation) of the Pollution Prevention Advisory Committee. The purpose of the meeting was to identify ways that the agencies can coordinate their efforts to protect occupational health and the environment, so that both issues are considered during the development of regulations, recommendations, and policies. The group developed a list of areas to work on together in the short and medium term.

**Diesel Exhaust in a County Sheriff's Department.** HESIS provided information on the hazards of exposure to diesel exhaust from trucks, buses, garbage trucks and other vehicles in the basement where Sheriff Department employees go to pick up prisoners. Staff discussed carbon monoxide toxicity and PAH carcinogenicity; the limitations of exposure standards in establishing "safe levels" to protect against diesel exhaust health hazards; use of ventilation and other control measures; and the employer's responsibility to provide a safe and healthful workplace.

**Respiratory Infectious Diseases - Nursing Home Employees.** HESIS provided information in response to concerns about transmission of respiratory diseases from patients, many of whom were being hospitalized with cough and fever. Several employees have developed respiratory illnesses and supervisors are unsure how to respond. Staff emphasized hand washing, but no special disinfectant for skin. To provide perspective on what is considered normal regarding respiratory illnesses, staff discussed the following background information on influenza from the CDC: (a) 10 - 20% of the general population gets influenza each winter; (b) prevalence this year is normal or average; (c) the vaccine is working this year; and (d) the average person gets two to



three colds per year.

**Cal OSHA Heat Stress Standard.** HESIS is participating on the Cal OSHA Heat Stress Advisory Committee to assist Research and Standards in determining the feasibility of developing a standard and the proposed scope and content.

**School Indoor Air Quality: Employee Health Issues.** HESIS responded to an inquiry from school employees in a local district regarding rashes, respiratory problems, and other symptoms. The school was closed March 13 due to extensive mold on classroom surfaces; apparently *Stachybotris atra* was found. HESIS provided information and referrals concerning molds in indoor air, Workers Compensation, medical treatment, and relevant Safety Orders. HESIS also responded to an illness cluster report among teachers at a public High School. After reviewing inspection reports from Cal/OSHA and from a private consultant, HESIS concluded that there was no exposure requiring further investigation in relation to the illnesses reported, based on the information provided by the caller. HESIS did not discern an etiologic link among the illnesses described.

**Dormitory Building Inquiry.** HESIS assisted the Environmental Health Investigations Branch of DHS in responding to an IAQ inquiry regarding a residential apartment building for college students. Reportedly because of a failed construction material called Exterior Foam Insulation System, there is extensive moisture intrusion associated with mold growth in insulation cavities. This building will be occupied only until the end of the semester. Species found include *Stachybotris* sp. and *Aspergillus versicolor*. HESIS provided guidance regarding conservative options for the temporary abatement strategy, so as to minimize resident and worker exposures and to obviate the need for a respiratory protection program for custodial staff.

**IAQ Inquiries.** HESIS continues to receive calls from California workers, employers, and agencies regarding IAQ in the workplace. We offer phone consultation and referrals. Callers with occupational IAQ concerns should be referred to our 24-hour message line, 510-622-4317. Please do not refer residence-related calls.

**Mercury from Fluorescent Lighting Tubes.** HESIS responded to a prison official who was concerned about the release of mercury vapor from fluorescent tubes, which are sometimes purposely broken by prisoners in small cells. Exposure can occur to prisoners and custodial staff. Calculated from manufacturer information, the worst-case exposure to mercury vapor could be approximately 850 µg/m<sup>3</sup> (micrograms per cubic meter), which exceeds the short-term limit for occupational exposures. HESIS advised that this level of exposure, if complete vaporization actually occurs, would be a significant health hazard.

## California Department of Health Service / Tobacco Control Section

B Joanne Wellman-Benson (JWellman@[dhs.ca.gov](mailto:JWellman@dhs.ca.gov))

**New DHS ETS Representative.** In March, Joanne Wellman-Benson, RDH, MPH, has joined the Department of Health Services Tobacco Control Section as a Health Education Consultant and the new representative for ETS. She can be reached at (916) 445-3737 and her e-mail address is given above.

**ETS Conference.** The Tobacco Control Section has begun to plan another ETS conference for Spring 2001. Unlike the conference held last fall in San Diego, this conference will be national in scope, with participants being invited from throughout the country to attend.

## **California Department of Industrial Relations (Cal/OSHA)**

B Jim Lim ([Jlim@hq.dir.ca.gov](mailto:Jlim@hq.dir.ca.gov))      <http://www.dir.ca.gov/DIR/OS&H/DOSH/dosh1.html>

**New Phone Numbers.** Phone numbers of many of the Cal/OSHA offices have changed in recent years. The new headquarters phone number is (415) 703-5100. Updated information can be found on-line: <http://www.dir.ca.gov/DOSH/offices.html>.

**Asbestos Training Approval Program.** This new program is in the process of approving AHERA and other asbestos training courses which are required in existing Cal/OSHA Title 8 regulations. After June 30, 2000, only Division approved training providers will be allowed to conduct AHERA courses in California. The program will also establish and maintain a roster listing trained individuals validated by the Division. The aim of the new program is to assure high quality trained individuals to perform asbestos-related work, and to eliminate fraudulent asbestos training certificates which are presently in use. The program will be entirely supported by fees that will be collected by the program.

**Airborne Contaminants 8 CCR 5155.** After completing a series of ad hoc advisory committee meetings to develop a proposal to update the PELs of 8 CCR 5155, the Division's proposal had a hearing at the May 11, 2000, Los Angeles public meeting of the Cal/OSHA Standards Board. The Division is presently reviewing the comments from the public; the proposal will be ready for adoption by the Board soon.

**Development of a Heat Stress Standard.** The Division is in the process of developing a much needed heat stress standard. The Division has been conducting ad hoc advisory committee meetings to assist in developing a proposed standard. The next ad hoc advisory meeting will be held sometime this fall. For more information, please contact Bob Barish at 415/703-5161.

**General Industry Lead Standard Recodified.** The Cal/OSHA Standards Board has recodified the occupational lead standard for general industry from 8 CCR 5216 to 8 CCR 5198. The old section number was in Article 110 which is now reserved for carcinogen standards only. Other than the section number change, there is no change to the lead standard.

**Petition for Changing the Laboratory Fume Hood Requirements.** The Division conducted an ad hoc advisory committee meeting on May 2, 2000 to evaluate two petitions requesting The Cal/OSHA Standards Board to reduce the ventilation requirements for laboratory fume hoods and to establish a performance standard instead of the existing strict ventilation standard. There will be more meetings on this subject. For more information, please contact Bruce Wallace at 415/703-5165.

## Lawrence Berkeley National Laboratory / Indoor Environments Program

B Mike Apte ([MGapte@lbl.gov](mailto:MGapte@lbl.gov))

<http://eetd.lbl.gov/iep/iep.html>

The IED is involved in a wide array of ongoing research projects relating to IAQ. A summary of projects is attached with staff contacts ([Go to Attachment](#)). Program information is also available at the web site.

## Office of Environmental Health Hazard Assessment / Indoor Air Risk Assessment Group

B Richard Lam ([RLam@oehha.ca.gov](mailto:RLam@oehha.ca.gov))

<http://www.oehha.org/>

**Indoor Reference Exposure Levels (IRELs).** As a result of the May 3-4, 2000 IAQ workshop in Sacramento, we were asked to develop and provide some health-based guidelines for some common indoor air contaminants. As a first step, we will establish IRELs for 10 indoor contaminants (benzene, chloroform, formaldehyde, methyl chloroform, methyl ethyl ketone, methylene chloride, nitrogen dioxide, perchloroethylene, styrene, and toluene). The numbers for these chemicals will be derived from the acute RELs document which has undergone the peer review process.

**Legislation.** A number of legislative bills were followed and some analyzed on their impact on OEHHA. These included AB 2260 (Health School Act of 2000), SB 280 (State buildings and publicly funded schools: standards), AB 2161 (Portable classrooms: detoxification) and the trailer bill AB 2872. The trailer bill was signed by Governor Davis and its impact on OEHHA (that relates to IAQ) includes (a) the evaluation and update of cancer risk assessment on the fetus, infants, and children (b) the establishment of the Children's Environmental Health Center (c) the identification of chemical contaminants commonly found in school sites (based on child-specific exposures and physiological sensitivities) and (d) consultation with ARB and DHS on the portable classroom study.

**Web-site Documents.** The following documents are available for downloading from OEHHA's web site (see above):

- The Toxic Directory: Resources (updated for 2000)
- Prop 65 Fact sheet. A comparison of the Proposition 65 warning and the designated government employee disclosure requirement.
- Asbestos fact sheet (new).

**Consultations.** Interesting IAQ-related calls from the public or other agencies:

- Potential health effects of phthalate esters. This relates to the use of diisoninyl phthalate and other dialkyl phthalate esters as plasticizers to impart softness and flexibility to a wide variety of products including soft children products such as teethingers, rattles, and toys.
- Respiratory effects of fabric softener emissions. Fabric softener pads or sheets are known to contain a number of chemicals including benzyl acetate, limonene, gamma-methyl ionone, linalool, ethanol, alpha-terpineol, beta-citronellol, and other unidentified esters, acetates, and alcohols. They are used in laundry dryers to prevent the buildup of static electricity. Emissions from these pads/sheets can cause eye irritation, difficulty breathing, mental confusion, and dizziness.
- Scotchguard products (SC). SC contain perfluorooctanyl sulfonate which can accumulate in

human and animal tissues. This chemical has been found in the blood supplies in the U.S, Europe, Japan and China at levels of 10 - 100 ppb. Manufacturer, 3M Corp., has committed to phase out SC by the end of 2000.

- Asbestos in crayons. Asbestos was found in certain brands of crayons due to the use of contaminated talc in the manufacturing process.

**Traffic Study.** OEHHA is conducting a study to determine the spatial variability of ambient concentrations of traffic-related pollutants within an area in relation to distance from major roadways and to perform a cross-sectional study comparing the respiratory health of children living and attending school nearer vs further from major roadways. Contact person: Dr. Janice Kim, (510) 622-3198, [Jkim@oehha.ca.gov](mailto:Jkim@oehha.ca.gov).

## U.S. EPA Region IX / Indoor Environment Team

B Barbara Spark ([spark.barbara@epamail.epa.gov](mailto:spark.barbara@epamail.epa.gov)) [http://www.epa.gov/oar/oria\\_ied.html](http://www.epa.gov/oar/oria_ied.html)

**Program Shift Means Less IAQ Training.** As anticipated, our FY2000 regional budget allocation has been augmented for the purpose of addressing programs related to the federal asthma initiative. The programs in questions are Indoor Air Quality Tools for Schools, the ALA program Open Airways for Schools, and in-home asthma education. The effort to achieve quantifiable results in these areas has precluded continuation funding for the training center agreement with the University of Tulsa for the array of IAQ workshops which have helped to build public and private stakeholder capacity in Region 9 for the past several years. Our work with Tulsa will now focus only on implementation of the IAQ Tools for Schools program. However, thanks to capacity carried over from the '99 agreement, we'll be providing three last training events, as described below.

**CARB IAQ Conference.** Barbara Spark presented twice from the podium at the CARB IAQ Conference in Sacramento, May 3-4, and one one final occasion spoke from the floor microphone. On each occasion, Barbara made a point of emphasizing the public purpose which would be achieved by the release of the CIWG-IAQ report on *Indoor Environmental Quality in California Public Schools*. We feel that release of this August 1998 report in the context of a clear and vocal state commitment to this issue will lend force to constructive activities already under way. Momentum has been growing on the IAQ/schools issue. A mechanism (IAQ Tools for Schools) is already available which can help schools prevent problems, and even resolve many existing problems without significant (sometimes, any) expense. U.S. EPA's current (and time-limited) TFS grants have created a corps of individuals ready to help schools now. Successful efforts by these grantees could lead to additional federal funding for this purpose; alternatively, this funding could dry up. We hasten to emphasize that current state initiatives hold great promise and will reap significant rewards; our concern is that opportunities not be lost to prevent damage to property and possibly health in the interim.

**Mold Courses Set for September 12-13, 2000 in San Diego.** Dr. Richard Shaughnessy of University of Tulsa will provide workshops on Sampling (9/12) and Remediation (9/13) for Mold with Drs. Elliot Horner and Phil Morey in San Diego. Given the rising awareness of mold problems and the increased need for reliable training on these subjects, we hope that CIWG-IAQ members will spread the word on these ~~last~~ chance events. Registration information is available

at the web site: <http://www.utulsa.edu/iaqprogram>. Those seeking more detailed information can request a brochure from the (918) 631-3290. Also, our office can provide the complete brochure text by e-mail. Send your request to [Nivolon.Monique@epa.gov](mailto:Nivolon.Monique@epa.gov)

**USA WEEKEND to Publish Cover Story on Mold/School IAQ.** The Sunday newspaper supplement *USA Weekend* will feature an article on school IAQ with a particular emphasis on mold in the August 20 issue, with continuing web site coverage. EPA's IAQ INFO line (800) 438-4318 will be listed as a resource; calls for information may increase to a variety of public agencies and health organizations. Complicating matters for our Region 9 response, Barbara Spark will be away until 9/5, and our public information person Sid Efron is out on extended medical leave. As always, we will refer people to the CAL-IAQ and EHI web pages.

**Asthma/IAQ Event Pending.** The final, general IAQ presentation with the University of Tulsa will be the course, *Indoor Air Quality Asthma and Allergen Control*. A course description and sample agenda can be viewed at the utulsa web site (see above) by clicking on [Aclass schedule](#). The date may be in February, but we're still grappling with the challenge of determining whether the LA or SF metro areas would be preferable for the site.

**Guidance for Health Professionals on Recognition and Management of Health Effects Related to Mold Exposure.** As a result of discussions between Barbara Spark and Michael Hodgson, a document to fill this need will be developed by an EPA grantee in the coming year. Dr. Hodgson will be a consultant to the project. Once the writing is completed, additional funding will be sought for production. Contact: Barbara Spark (415) 744-1132 or [spark.barbara@epa.gov](mailto:spark.barbara@epa.gov) (NOTE: Barbara Spark will be out of the office until Sept. 5).

**Grants For IAQ Tools for Schools (IAQ TFS).** Thanks to the federal asthma initiative, Region 9 has been able to provide grants to a number of entities (all but one to American Lung Association affiliates) to advance efforts to help schools implement the IAQ TFS program. While we can't yet announce the grantees, many of the major metropolitan areas in California will be served. We expect to focus a good deal of our efforts in the coming year on coaching and interacting with these grantees, as well as with other ALA affiliates which may be getting similar grants from their national organization. Contact: Louise Hill (415) 744-1046 [hill.louise@epa.gov](mailto:hill.louise@epa.gov).

**Success at SFUSD with IAQ TFS.** The San Francisco Unified School District adopted an IAQ Policy that directed the School Health Programs to work with the Facilities Planning & Management Program to implement a policy based on the EPA Tools for Schools Action Kit. Of 15 pending Pilot Schools, eight schools have already initiated the program, including EPA-assisted walk-throughs. Corrective follow-up by District and school-site staff has already begun. The walk-throughs proved the Kit's usefulness by revealing actions which could be taken immediately to improve IAQ. The School District has now created a paid IAQ Coordinator position for Hene Kelly, the teachers' union representative who's spearheaded district progress. Contact: Shelly Rosenblum (415) 744-1047 [rosenblum.shelly@epa.gov](mailto:rosenblum.shelly@epa.gov)

**Grants for Open Airways For Schools.** All the Region 9 grantees doing IAQ TFS work will also receive funds to bring Open Airways for Schools to 3rd-5th graders with asthma. This ALA program teaches children to manage their asthma, including indoor environmental triggers.



Attempts will be made to accomplish IAQ TFS and O.A. for Schools at the same school sites.  
Contact: Louise Hill (415) 744-1046 [hill.louise@epa.gov](mailto:hill.louise@epa.gov).

**In-Home Asthma Education.** HQ has allotted to Region 9 \$30K in grant funds to support in-home education for asthmatic children on indoor environmental triggers. Given the high per family cost for such interventions *viz a viz* the small size of the award, we are seeking additional information on existing programs prior to giving the grant. Contact: Barbara Spark.

**National Indoor Environments Division In-Home Education Grants.** Our HQ IAQ program has announced availability of grant funding totaling \$200K, to fund projects up to \$100K on asthma in-home education. The information (posted at this writing on the asthma page of the EPA IAQ web page <http://www.epa.gov/iaq/asthma/index.html>) elicited a great deal of interest. Applications must be postmarked by August 7, and a decision is expected by the end of the month.

**IAQ TFS Mentor Program to Expand to SF Bay Area.** Efforts are underway to expand the successful (L.A.) ALA/AIHA IAQ TFS Mentor program to the S.F. Bay area. This program has experienced some false starts in SF due to the absence of a coordinator. Beth Saiki of the American Lung Association of San Francisco and San Mateo Counties will be filling that role in the coming year. Qualified mentors are not restricted to I.H.s. *What a fabulous opportunity for members of the CIWG-IAQ to get involved!* Contact Beth Saiki (650) 994-LUNG, [beths@alasfm.org](mailto:beths@alasfm.org).

**IAQ State Stakeholders Meeting Presented by The Environmental Law Institute (ELI).** ELI presented its second national IAQ workshop for state and local officials in Alexandria, VA on March 24-25, 2000. Twenty-four states and the District of Columbia were represented. Barbara Spark from Region 9 office attended. At the request of those attending, there was considerable focus on public health issues relating to mold. A summary report was prepared by ELI staff, and it can be requested from ELI (<http://www.eli.org>).



## WORKING GROUP COMMITTEES

### Indoor Environmental Quality of Schools

B Jed Waldman ([JWaldman@dhs.ca.gov](mailto:JWaldman@dhs.ca.gov))

**Committee Report Status.** The report *Indoor Environmental Quality in California Schools: An Assessment of Needs and Opportunities* is still awaiting approval. As you may recalled, comments on the committee report were sent to DHS by departmental staff at ARB, CDE, CEC, DGS, DHCD and OEHHA, and the report was re-titled and updated in August 1999. If it approved, we will have the report posted on the web as soon as possible.

**Healthy School Legislature, 1999.** An amended version of Assembly Bill (AB) 1207 was passed in the final days of the 1999 legislative session; but it was vetoed by Governor Davis. The final form of the bill and the Governor's veto message can be found on-line at the State's *LegInfo* web site, e.g., [http://www.leginfo.ca.gov/pub/bill/asm/ab\\_1201-1250/ab\\_1207\\_vt\\_19991010.html](http://www.leginfo.ca.gov/pub/bill/asm/ab_1201-1250/ab_1207_vt_19991010.html).

**Healthy School Legislature, 2000.** Assemblyman Shelly reintroduced some components of his Healthy School bill with a new bill, AB 2260. The bill addresses pesticide use and best management practices for healthy schools. The bill passed the Assembly at the end of May, and passed in the Senate Committee on Environmental Quality. The bill's status and its current version can be found on-line at *LegInfo*, <http://www.leginfo.ca.gov/bilinfo.html>.

**Summary of AB 2260.** The bill would require that the preferred method of managing pests at school facilities be effective least toxic pest management practices and would further require that the state take the necessary steps to ensure that the preferred method is carried out at school facilities. It would require each school site to maintain records of all on-site pesticide use for a period of 4 years and make the records available to the public upon request. The bill would require, on an annual basis, the school district designee to provide to all staff and parents or guardians of pupils enrolled at a school written notification addressing, among other things, expected pesticide use. It would require the school district designee to post warning signs prior to application of pesticides at a school facility. The bill would require the Department of Pesticide Regulation (DPR) by July 1, 2001, and at least annually thereafter, to make a list of pesticides classified or identified, as prescribed, available to all schools, and it would require DPR to promote and facilitate the adoption of integrated pest management programs, including developing a model program guidebook in conjunction with other State agencies, maintain an internet website, and establish an integrated pest management training program. The bill would establish a Healthy Schools Ombudsman to maintain a toll-free telephone number to receive complaints and questions regarding possible school site environmental health hazards or contamination and respond as prescribed. The bill would require the Healthy Schools Ombudsman to develop and distribute to every school district a guidebook detailing available resources that address the environmental safety of a school site. This bill would require the Healthy Schools Ombudsman to prepare an annual report containing specified information for the Legislature to be submitted on an annual basis beginning no later than January 1, 2002.

## Building Design and Operations

B Leon Alevantis ([LAlevantis@dhs.ca.gov](mailto:LAlevantis@dhs.ca.gov))

**Environmental Specifications for Office Workstations.** With funding through the California Integrated Waste Management Board (CIWMB), we were able to retain Hal Levin to help us write office furniture specifications for indoor air quality, recycled contents, and task lighting. The specifications were submitted to Department of General Services (DGS) Procurement Branch for incorporation in their 3-year, \$60M, contract for office furniture systems. The specifications were mailed to the furniture manufacturers on the DGS's list of approved manufacturers for review and comments. Some manufacturers could not respond to our specification without the technical specifications from DGS. DGS recently completed these specifications and we are waiting for the final version of these specifications incorporating our comments. This document will be mailed to the manufacturers for review and comments. After receipt of the manufacturers' comments, the environmental and technical specifications will be finalized and will be incorporated in the bid documents.

**Capitol Area East End Project.** DGS has agreed to the design and installation of underfloor ventilation at Block 225 on a demonstration basis. The requirement from Department of Finance (DOF) is that DGS funds a research study through the UC Berkeley's Center for the Built Environment (CBE) to study and quantify the economic benefits of this type of ventilation system including increases in productivity. A first draft of the study design has been developed by CBE. DOF had numerous comments on the study design and we plan to meet with them in the near future in order to discuss their concerns. An oversight document has been prepared by the Green Team and DGS. This document describes the Green Team's role in the design, construction, and operation of the East End Project. In addition, a matrix has been developed to assist DGS in contacting Green Team members during the change order process. The Green Team has met with both design/build teams and their contractors/subcontractors in order to discuss green issues.

**Green Building TaskForce.** Members of the taskforce gave a one-day training to the Los Angeles Unified School District (LAUSD) on green building issues. About 130 individuals participated, including architects, engineers, and maintenance staff. The presentations were focused on how to address green issues on new construction and how to best maintain existing ones. This document has been finalized and is available on the web site of Eley and Associates: [www.eley.com/lausd](http://www.eley.com/lausd).

The Green Team has been meeting on a monthly basis. Members of the Green Team have been meeting with DGS on another new state project known as the *Butterfield Project* which will house the Franchise Tax Board (FTB). The Green Team has also been contacted from CalPERS presently planning a new state of the art green office building for their use.

**Sustainability Executive Order.** The Governor's office has requested the identification of possible rollout events for the signature of the Executive Order. This executive order would set sustainable goals for state buildings and establish the California Sustainable Building Council and a Sustainable Building Taskforce (currently known as the Green Building Taskforce).

## **FUTURE MEETINGS**

Upcoming meetings of the CIWG-IAQ are scheduled as follows:

- September 13, 2000, CARB Headquarters, 2020 L Street, Sacramento
- December 6, 2000, DHS Laboratory, 2151 Berkeley Way, Berkeley
- March 8, 2000, CARB Headquarters, 2020 L Street, Sacramento
- June 7, 2000, TBA

## **PVC in Buildings**

### **by Jan Stensland-Patton** (Jan@JSPattoncom)

#### **Sources of Dioxin Pollutants**

- Incinerators - solid waste, medical and hazardous waste
- Pulp and paper mills
- PVC plastic production

#### **Starting Points: New EPA Dioxin Report**

- Far more dangerous than first thought.
- Harmful effects can occur at levels found in Americans.
- 90% of exposure from food we eat, especially fish, meat, eggs, and dairy.
- Dioxin can be toxic as low as a 14 trillionths of a gram.
- EPA will not set a recommended dose because the average level in those tested is higher than what would be recommended levels.
- Upper bound cancer risk for dioxin is 1:1000 to 1:100 for “the average body burdens”.

#### **Potential Health Effects**

#### **Criteria for Evaluating Polymer Problems**

##### **Sustainability Criteria**

- Extraction
- Transportation
- Manufacture
- Installation
- Maintenance
- Recyclability
- End-of-use Disposal
- Social Issues

##### **How Sustainable Is It?**

- Will the material minimize energy use?
- Will the material adversely affect the health of building occupants?
- Are significant toxic or hazardous by-products created during the manufacture of the materials, and do these by-products pose a risk of exposure to workers or the environment?
- How much solid waste is generated during the manufacturing process?
- Are the raw materials and/or manufacturing locations far from the building site?

##### **What This Means; Need:**

- More research.
- To improve communication channel between research bodies and practitioners.
- Government to partner.
- More education of building design and construction professionals.
- Training programs.
- To improve the awareness of the general public.

**LAWRENCE BERKELEY NATIONAL LABORATORY  
INDOOR ENVIRONMENT DEPARTMENT**

**CURRENT INDOOR ENVIRONMENTAL  
RESESEARCH ACTIVITIES**

**JULY, 2000**

**Ventilation and IAQ Control Technologies**

**W.J. Fisk, A.J. Gadgil**

**Ventilation Measurement Methods (DOE)**

*Measuring outside air flow in AHUs:* Current ventilation data indicate that there are wide variations in ventilation rates among buildings. In many buildings, minimum ventilation rates are well below or above the rates in applicable standards. These data and our research experience demonstrate that the common methods of measuring and controlling the rate of outside air supply by air handlers are often inadequate. The consequence is poor air quality in some buildings and excessive ventilation rates in other buildings. Starting in the middle of FY 2000, we initiated a new research effort on methods of monitoring and controlling rates of outside air supply by air handling systems.

**VOC Sources, Emissions and Controls (DOE)**

*Modeling of Emissions of VOCs from Indoor Materials:* Work is continuing in collaboration with Virginia Tech (VT) to develop and validate physical models for predicting emissions of volatile organic compounds (VOCs) from various solid materials used in buildings. Sheet vinyl flooring is being used as the exemplary material for this effort. An objective of the research is to produce a less-expensive and superior alternative to emissions testing in environmental chambers for estimating VOC emission rates from such materials.

*Joint Research and Demo Project on Energy Efficient and Healthy Homes:* One objective of this research is to determine the primary sources and entry pathways of the most abundant and persistent VOCs in new houses, including houses with energy-efficient features. A study is currently in progress to identify and quantify the sources of terpene hydrocarbons, aldehydes and carboxylic acids in new manufactured houses. Some of these compounds are relatively strong sensory irritants and their concentrations in new houses often exceed odor thresholds.

**Ventilation and Indoor Air Quality Studies (DOE, NIOSH)**

*Assessment of Particle Control Technologies:* The objectives of this effort are to quantify the reductions in indoor concentrations of particles, from various sources, that result when a variety of air cleaning measures are employed, and to characterize the associated costs and energy consumption. This work is based on analyses of existing data and modeling. The sources of particles considered are outdoor air (fine mode), dust mites, cats, environmental tobacco smoke, and droplet nuclei from

coughs and sneezes. The particle air cleaning options include filtration, with various filter efficiencies, and electronic air cleaning. We are evaluating air-cleaning equipment installed within HVAC systems and stand-alone devices.

*Task Ventilation Optimization:* In prior years, we have investigated the ability of several task ventilation systems in providing better ventilation, and reduced pollutant levels, at the breathing zone, relative to conventional ventilation systems with well-mixed indoor air. The results of the most recent set of experiments were quite promising. All of the commercially-available task ventilation systems have been designed to provide local control of thermal comfort. Improved ventilation at the breathing zone has been an incidental feature of these systems. Starting in the second half of FY2000, we will initiate experiments and modeling to optimize ventilation performance. Rather than evaluate commercial products that have not been optimized for ventilation performance, we will design and evaluate new technologies for supplying air near the occupant.

## **Airflow and Pollutant Dynamics in Buildings**

*Objectives and LBNL Role:* This is one of the four projects in the Fate and Transport Thrust Area of the Chemical and Biological Weapon Nonproliferation Program. LBNL is responsible for further developing and incorporating some of our existing models for deposition of aerosols and vapors in ducts and on indoor surfaces into the COMIS multizone air flow model, for developing new modules for incorporation, and for the analyses of various scenarios involving releases in or near buildings. The objectives are to be able to predict indoor concentrations over time and to determine the best building management strategies to reduce human exposures to hazardous aerosols and vapors.

### **COMIS Model**

*Air Flow and Pollutant Dispersion in a Large Room:* We are using a combination of computational fluid dynamics (CFD) modeling and experimental work to advance CFD models for use in buildings and to help us to develop a simpler "lumped parameter" module for air flow and pollutant dispersion in a single, large room, *e.g.*, an auditorium, to incorporate into COMIS. This work also involves a collaboration with scientists in France who are developing CFD models.

## **Healthy Buildings and Productivity Studies**

**W.J. Fisk**

*Healthy Buildings Intervention Study (collaboration with NIOSH):* Mark Mendell continued to draft the longer paper on the health-related findings of the particle intervention study and scheduled a visit to LBNL in early June to work on this paper.

*Ventilation Rate Intervention Study (Collaboration with Center for the Built Environment):* In this study, we will quantify the relationships of worker performance in a call center with building ventilation rate and air temperature. Worker performance will be measured at three relatively constant outside-air ventilation rates. The minimum rate will correspond to applicable code requirements. Ventilation rates will be changed once per week over a 12-week period (*i.e.*, three one-week periods of data collection at each ventilation rate). Indoor air temperatures will fluctuate naturally. Building occupancy is known to vary substantially.



*Analyses Of Data From The Epa Base Study(DOE)* VOCs and SBS Symptoms: EPA has collected a large set of data from office buildings, including building characteristics, air pollutant concentrations, and SBS symptom prevalences. We have used statistical models to analyze data from the first set of buildings and learn about the associations of volatile organic compounds with symptoms. The analysis will now be extended, using the data from all 100 buildings.

## **Exposure and Risk Research**

**T.E. McKone , W.J. Fisk, A.T. Hodgson, R.G. Sextro,**

*Further Characterization of Environmental Tobacco Smoke (ETS) (Tobacco-Related Disease Research Program of the State of California):* In this project, laboratory and field research is being conducted to assess the usefulness of particle-bound components of ETS as tracers for exposure assessment studies.

*Vapor-phase Organics in Environmental Tobacco Smoke (Tobacco-Related Disease Research Program):* The project focuses on quantifying human exposure to vapor-phase organic compounds in ETS under a range of realistic smoking patterns and ventilation rates. Special attention is being paid to sorption processes that can have a large impact on airborne concentrations of semi-volatile organic compounds (e.g., nicotine) both during and long after active smoking periods

*Performance of Smoking Rooms (Tobacco-Related Disease Research Program):* IED has received support for a study of the performance smoking rooms. This research will be performed in collaboration with the California Department of Health Services. Laboratory studies will assess the rate of ETS leakage from a smoking room to the adjoining space as a function of smoking room physical characteristics, door usage, and temperature and pressure differences. A mathematical model of smoking room performance will be developed and model predictions will be compared with measured data. A final phase of the project will assess the accuracy of the model in predicting the performance of smoking rooms located in a small number of office buildings.

*Multi-domain Framework for Integrating Models and Measurements of Multimedia Environmental Contaminants (Sponsored by the U.S. Environmental Protection Agency[EPA]):* The goal of this project is to develop and apply models to provide a more complete picture of both how human exposure comes about and how precisely it can be quantified for a number of important pollutants. These efforts are being organized around two research components: (1) an indoor/outdoor model for total human exposure to particulate matter (PM); and (2) development and evaluation of source-to-dose models for persistent pollutants. These two components include a number of research areas.

*Total Risk Integrated Methodology (TRIM) Project (sponsored by U.S. Environmental Protection Agency):* The Total Risk Integrated Methodology (TRIM) is an EPA project to develop models and data for assessing the multimedia residual health and ecological risk from pollutants released to air sheds. The LBNL team is working on two components of the TRIM project: (1) testing, evaluation, and validation of the TRIM.Fate module; and (2) development of the TRIM.Expo multimedia, multi-pathway exposure model.

*Inter-Individual Differences in Metabolism of Carcinogens as a Risk Factor for Breast Cancer (U.S. Dept. of the Army):* The purpose of this project is to test for possible genetic factors that contribute to breast cancer risk, such as inter-individual variation in the level of enzymes that activate or detoxify

environmental carcinogens. A recently identified cytochrome P450 enzyme, CYP1B1, activates polycyclic aromatic hydrocarbons to carcinogenic intermediates; in addition, it metabolizes estradiol to a carcinogenic intermediate. Therefore, CYP1B1 might play a particularly important role in breast cancer. Two polymorphisms in the DNA sequence of CYP1B1 (m1 and m2) have been described that can alter the activity of the enzyme.

*Measurement of Semi-Volatile Organics in Ambient Air (funded by the Interagency Agreement between EPA and DOE):* The objective of this project is the development, validation and application of new measurement methods for the accurate determination of semi-volatile organic pollutants in ambient air. Such species partition between the gas and particle phases in ways that complicate measurement and apportionment efforts. LBNL is contributing to several multi-investigator studies whose overall goal is the characterization of carbonaceous particles across the U.S.